STATE OF CALIFORNIA
HIGHWAY TRANSPORTATION AGENCY
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS
TRAFFIC DEPARTMENT
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In Cooperation with the
U.S. BUREAU OF PUBLIC ROADS

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FREEWAY PEDESTRIAN ACCIDENTS

1958 - 1962

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Summary & Conclusions

1. There are approximately 130 pedestrian accidents on California freeways each year. (55 fatal and 75 injury).
2. Walking along the shoulder on a freeway is not nearly as hazardous as previously supposed. Only 6 persons were struck while walking along the freeway shoulder in 5 years, on all California freeways. During this same 5-year period, 8813 pedestrians were struck in incorporated areas while crossing at signalized intersections with the green light, and 13,075 pedestrians were struck in incorporated areas while crossing at non-signalized intersections.
3. Thirteen per cent of all freeway fatal accidents involve a pedestrian.
4. Forty-three per cent of all pedestrians struck are on the freeway because their vehicles are disabled or were involved in a prior accident.
5. Thirty-three per cent of all pedestrians struck are on the freeway for the specific purpose of crossing the freeway.
6. Only 5.2 per cent of the pedestrians struck are hitchhiking. It appears that present controls of hitchhiking or walking on freeways are effective and that further efforts in this regard would be relatively fruitless.

7. Of the remaining 18 per cent, 9 per cent are working on the freeway and it was undetermined why the other 9 per cent were on the freeway.
8. Two-thirds of all pedestrian accidents on freeways occur during hours of darkness.
9. Seventy per cent of the pedestrians are struck on the main traveled lanes; 18 per cent on the shoulders; 7 per cent on ramps; 3 per cent in the median; and, 2 per cent undetermined.
10. Forty-two per cent of freeway pedestrian accidents are fatal.

Introduction

Freeways are not designed to accommodate pedestrians and for this reason most freeway ramps are posted to inform pedestrians that they are prohibited from entering the freeway. Dismounted vehicle occupants (persons who drove onto the freeway and dismounted from their vehicle for some reason) are not specifically prohibited from walking along the freeway.

In addition, all freeways are fenced to prevent entry by pedestrians, animals, and vehicles. In urban areas, a six-foot chain-link fence is placed along the right of way. In rural areas, a four-foot wire fence is used. Pedestrian barriers consisting of four- or six-foot chain-link fence are often placed in the median within interchange areas to prevent pedestrians from crossing the freeways. Cable chain-link median barrier, installed on approximately 150 miles of freeway, also serves as a continuous pedestrian barrier and 50 miles of blocked-out metal beam median barrier act as a lesser deterrent.

In spite of fences, signs, and barriers, there are still approximately 130 pedestrian accidents on freeways each year. Of these, approximately 55 are fatal and 75 are injury accidents. This comprises 13% of all freeway fatal accidents.

Chapter I

Statistical Breakdown of Pedestrian Accidents

Freeway fatal accidents in California during the period 1958 to 1962, inclusive, can be classified as shown below:

Type of Fatal Accident	Per Cent of Total
Single Vehicle	50.5
Pedestrian	12.7
Head-on (Cross Median and Wrong-Way)	15.8
Rear-End and Sideswipe	21.0
Total	100.0%

The Division of Highways is doing research on both cross-median and wrong-way accidents on freeways and the California Highway Patrol is researching single vehicle accidents. Research on pedestrian accidents was undertaken because this seemed to be a type of accident that specific preventatives might have been devised for.

Table I shows the number of pedestrian and total freeway accidents by severity for the five years included in this study (1958 - 1962) and for 1963.

Table I

Severity of Pedestrian and All Freeway Accidents

California Freeways

	Pedestrian Accidents				All Freeway Accidents			
Year	Fatal	Injury	PDO	Total	Fatal	Injury	PDO	Total
1958	32	20*	0	52	170	3,339	4,913	8,422
1959	18	14*	0	32	215	4,172	5,623	10,010
1960	36	47	0	83	259	5,902	7,871	14,032
1961	36	83	0	119	267	7,160	9,136	16,563
1962	51	79	0	130	390	9,081	11,350	20,821
Totals	173	243	0	416	1,301	29,654	38,893	69,848
1963	55	115	0	170	400	10,511	13,756	24,667

The 416 pedestrian accidents were widely scattered throughout the freeway system and no locations were found which had a concentration of pedestrian accidents.

Table II indicates why each pedestrian was on foot on the freeway and what he was doing when struck. Other tables were made to determine whether there were differences between urban and rural pedestrian accidents. It was found that there are almost equal numbers of rural and urban pedestrian accidents and that they are distributed throughout the various classifications in Table II in a very similar manner.

* Does not include urban freeways.

TABLE II

NUMBER of FREEWAY PEDESTRIAN ACCIDENTS
California Freeways
1958 - 1962

WHAT PEDESTRIANS WERE DOING WHEN STRUCK	WHY PEDESTRIANS WERE ON FOOT ON THE FREEWAY							
	Disabled Vehicle	Prior Accident	Working	Trying to Cross Fwy	Hitch-hiking	Reason Unknown or not Stated	TOTALS Number	TOTALS Per-Cent
Walking Parallel to Center Line on:								
Traveled Way	1	1	0	0	2	11	15	3.5
Shoulder	5	0	0	0	0	1	6	1.4
Median	0	0	0	0	0	1	1	0.2
Ramp	3	0	0	0	5	5	13	3.1
Sub-Total	9	1	0	0	7	18	35	8.2
Standing on:								
Traveled Way	18	25	15	0	0	9	67	16.2
Shoulder	10	9	15	0	2	2	38	9.2
Median	1	4	5	0	0	0	10	2.4
Ramp	5	4	3	0	1	4	17	4.1
Sub-Total	34	42	38	0	3	15	137	31.9
Working on Vehicle on:								
Traveled Way	38	0	0	0	0	0	38	9.2
Shoulder	29	0	0	0	0	0	29	7.1
Median	3	0	0	0	0	0	3	0.7
Ramp	0	1	0	0	0	0	1	0.2
Sub-Total	70	1	0	0	0	0	71	17.2
Crossing Freeway	13	5	0	138	11	3	170	40.8
Unknown or not Stated	2	2	0	0	1	3	8	1.9
TOTALS Number	128	51	*38	138	22	39	416	
Per-Cent	30.8	12.4	9.1	33.2	5.2	9.3		100.0

*Division of Highway's Personnel 10
Contractor's Personnel 4
Police Officer's 21
Tow Truck Operator's 3
TOTAL 38

Table III summarizes the location of each pedestrian accident regardless of why the pedestrians were on the freeway.

Table III

Location of Pedestrians When Struck

California Freeways

1958-1962

Location	Number of Pedestrians Accidents	Per Cent of Total
Traveled Way	290	69.7
Shoulder	73	17.6
Ramp Traveled Way	26	6.2
Ramp Shoulder	5	1.2
Median	14	3.4
Unknown	8	1.9
Totals	416	100.0

The moral, of course, is to stand as far away from the main stream of traffic as possible. Some pedestrians, such as those working on the freeway, have little control over where they stand. On the other hand, most pedestrians do have a choice of where to stand and yet some of them stand on the traveled way.

Chapter II

Why Pedestrians were on Foot on the Freeway

A. Disabled Vehicles

Persons who dismounted from a disabled vehicle accounted for 30.8% of all pedestrian accidents. Quite often the drivers of these disabled vehicles park on the traveled way rather than the shoulder or median. Some freeway sections, such as viaducts and long bridges, do not have a shoulder or median, and disabled vehicles must park on the main traveled lanes. Some drivers just let their disabled vehicles coast to a stop and make no attempt to park in a safe place.

Once the vehicles come to a stop, the drivers and passengers generally do one of three things:

1. Walk off the freeway to solicit assistance,
2. Work on their vehicle, or
3. Stand around and wonder what to do.

Working on a vehicle on or near the main traveled lanes is, of course, very hazardous. However, over one-half of the disabled vehicle operators were doing just that when struck. The safest thing to do is to stay as far away as possible from the main stream of traffic.

B. Prior Accident

Persons involved in a prior accident accounted for 12.4% of the pedestrian accidents. These persons very seldom walk off the freeway nor do they work on their vehicles. They usually stand around and wait for

a police officer and tow truck or they try to flag traffic. The ones who stand on or near the main stream of traffic are more often struck by a vehicle than those who stand as far away from traffic as they can.

C. Working

Persons who are working on the freeway are there legally and are usually "protected" by signs, barriers, flashing lights, flags, etc. In spite of this protection, many workers are not very selective about where they stand. For instance, police officers can stand almost any place to issue a citation, or talk to motorists; yet many of them stand on the shoulder only a few inches from the main traveled lanes.

As shown on Table II, police officers constitute over one-half (21 of 38) of the workers involved in pedestrian accidents. Police officers and other workers are very necessary on freeways and it is unfortunate that some lose their lives regardless of where the fault lies.

D. Trying to Cross Freeway

Of all pedestrians involved in accidents, more were on the freeway for the specific purpose of crossing than for any other reason (33.2%). There are many, many structures on freeways built especially for pedestrians so they can cross safely (pedestrian overcrossing and undercrossings). In addition, pedestrians can cross safely at most structures built for vehicle crossings.

To walk onto a freeway, a pedestrian must climb a wire fence or must walk along a ramp past a sign which informs pedestrians that they are prohibited from entering the freeway. Most pedestrians who cross a freeway know that they are violating the law and doing something unsafe, and yet they do it anyway.

E. Hitchhiking

It has long been thought that hitchhikers constituted a major portion of pedestrian victims on freeways. However, they comprise only 5.2% of all pedestrian accidents, and half of these were crossing the freeway and were not really in the act of hitching a ride when struck. In fact, only 3 of the 22 hitchhikers were standing along the freeway when struck. One reason that hitchhikers are not struck very often may be that they stand off of the main traveled lanes and face oncoming traffic while they are actually hitchhiking.

Chapter III

What the Pedestrians Were Doing When Struck

A. Walking Parallel to Centerline

People walking along the freeway comprise only 8.2% of the freeway pedestrian accidents. It is hard to believe that anyone would walk on the main traveled lanes (assuming a shoulder is available), yet it is done.

Transients are seen walking along freeways and other roads quite frequently. Most of them probably don't know the difference between freeways, expressways, and other multilane roads, nor do they care.

Despite the fact that hundreds of vehicles are disabled on freeways in California every day, and that hundreds of thousands of pedestrians, including disabled vehicle operators, walk along freeways during the course of a year, only 6 persons were struck in 5 years while walking on the freeway shoulders in California. This is less than 2% of all freeway pedestrian accidents and it infers that walking to the nearest exit for professional aid is not nearly as hazardous as previously supposed.

B. Standing

Persons standing within the freeway right of way constituted 31.9% of all freeway pedestrian accidents. In 114 of 132 of these accidents, the pedestrians were on the freeway because their vehicles were disabled, they were involved in a prior accident or they were working. These people were on the freeway for reasons over which they had no control. Most of them did have some control over where they stood, yet in 67 of 132 accidents they stood on the main traveled lanes.

An edge of pavement stripe and/or diagonal shoulder striping might help pedestrians realize where they are standing.

C. Working on Vehicle

In 17.2% of the pedestrian accidents, a pedestrian was working on his vehicle. There seems to be a large number of people who will work on a vehicle when it is obviously unsafe to do so.

An eight-foot shoulder with a dike or guard rail does not provide enough room to change a tire on the left side of the vehicle without the pedestrian encroaching on the main traveled lanes. To change a tire on the right, the vehicle must encroach upon the traveled lanes to allow room between the vehicle and the dike or guard rail.

D. Crossing Freeway

There were 170 pedestrians struck while actually crossing the freeway. Of these, 138 were on the freeway for the specific purpose of crossing. The remainder were crossing to or from their vehicles or were hitch-hikers crossing the freeway.

Table IV shows that 37% of the pedestrian accidents occurred within interchanges. Approximately 40% of all freeway mileage is within interchanges.

Table IV

Pedestrians Who Were Crossing the Freeway

California Freeways

1958-1962

Where Accident Occurred	Number of Pedestrian Accidents	Per Cent of Total
Interchange Area	63	37.1%
Between Interchanges	105	61.7%
Unknown	2	1.2%
Total	170	100.0%

Of the 63 pedestrian accidents which occurred within an interchange, 10 occurred at locations where there is a pedestrian barrier or deterrent in the median. (See Table V)

Table V

Pedestrian Barriers and Deterrents

California Freeways

1958-1962

Type of Barrier or Deterrent	Number of Pedestrian Accidents
Cable Chain-Link Median Barrier	5
Double Blocked-Out Metal Beam Barrier	4
48" Chain-Link Fence	1
72" Chain-Link Fence	0
None	53
Total	63

High traffic volumes seem to act as a pedestrian barrier. The average daily traffic was not tabulated at each pedestrian accident. However, it appears that the higher volume freeways have a higher proportion of dismounted motorist accidents and that the lower volume freeways have a higher proportion of pedestrians crossing the freeway. The high volumes seem to act as a pedestrian barrier and to increase the number of dismounted motorists.

Chapter III

Miscellaneous Factors

Lighting

Table VI presents the lighting condition at the time of the accident for pedestrian and for all freeway accidents. Two-thirds of all pedestrian accidents occurred at night. It is not known how much pedestrian activity there is on freeways at night compared to daytime.

Table VI

Freeway Pedestrian Accidents

California Freeways

1958-1962

Light Condition

Light Condition	Per Cent of Total	
	Pedestrian Accidents	All Accidents
Daylight	30.5	52.2
Dusk or Dawn	2.7	2.5
Dark	66.8	45.3
Dark - No Highway Illumination	40.4	25.4
Dark - Highway Illumination	26.4	19.9
Totals	100.0	100.0

Hour of Day

Figure I shows the relationship between pedestrian and all accidents during each hour of the day. Here, again, it is shown that there is a greater frequency of pedestrian accidents at night, particularly between 6 P. M. and 3 A. M.

Fifty-seven per cent of the pedestrian accidents occurred between 8 P. M. and 6 A. M., and 58% of the freeway fatal accidents occur during these same hours. Therefore, pedestrian accidents do not account for the increase in freeway fatal accidents at night, but they do contribute proportionally just as much as the other types.

Viaducts

When a vehicle becomes disabled on a viaduct or long bridge without shoulders, the operator and the vehicle must remain on the main traveled lanes simply because there is no place else to go. Table VII indicates the pedestrian accidents on some viaducts for a three-year period.

All of the pedestrians struck on the viaducts were disabled vehicle operators. There are rarely any pedestrians crossing a viaduct because they can walk underneath at almost any point. The viaducts had a higher rate of pedestrian accidents even though the only pedestrians on the viaducts were disabled vehicle occupants.

FIGURE 1

HOUR OF OCCURRENCE
Pedestrian, Fatal and All Accidents
California Freeways 1958 - 1962

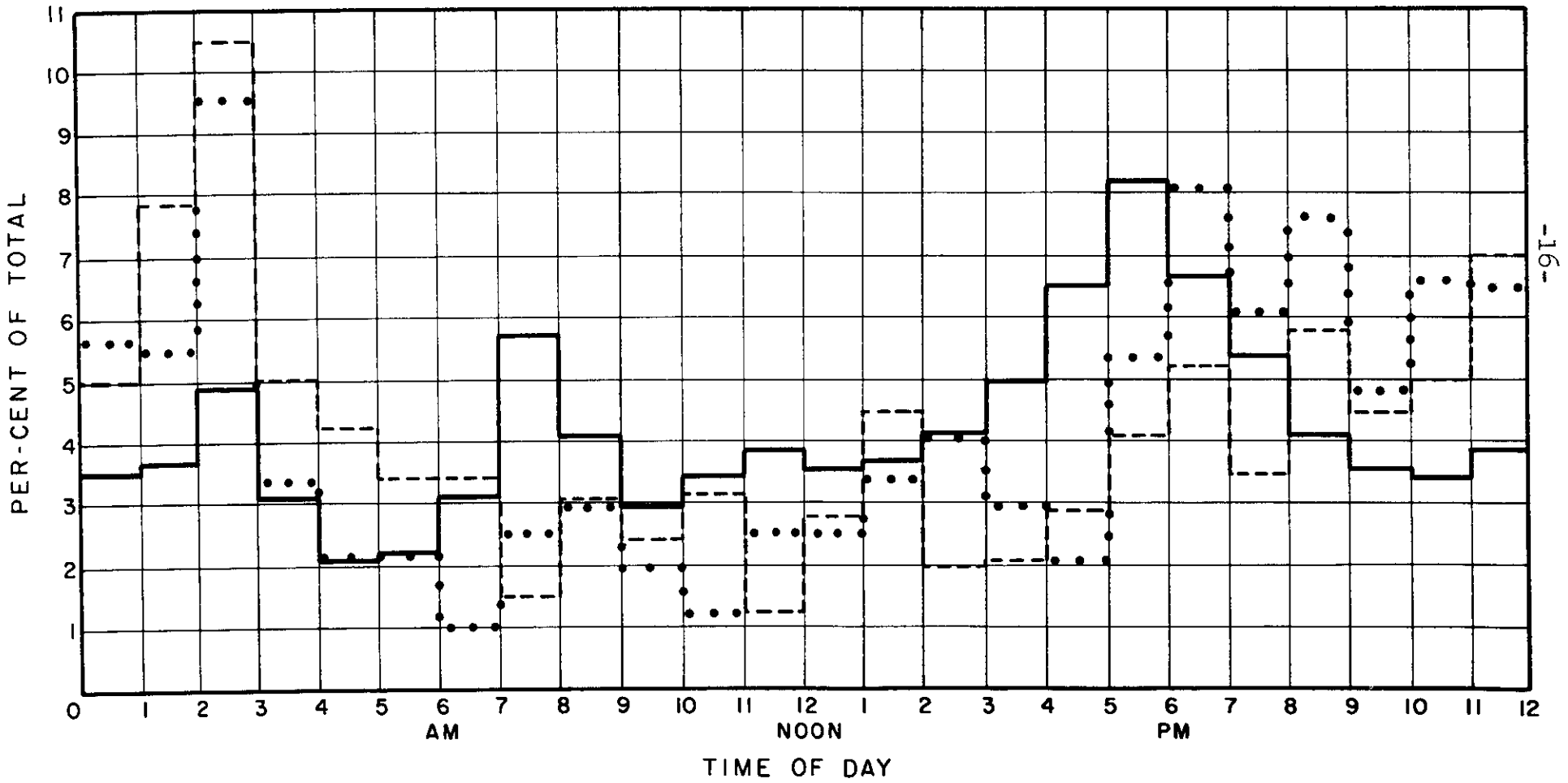

Table VII

Pedestrian Accidents on Viaducts without Shoulders

California Freeways

Freeway	Number of Pedestrian Accidents				Million Vehicle Miles	Ped. Acc. per 100 MVM
	1960	1961	1962	Total		
Nimitz (Cypress St. to Distr. Struct.)	4	0	1	5	151	3.31
Central	0	0	0	0	106	0.00
Embarcadero	2	0	0	2	42	4.76
Total	6	0	1	7	299	2.34
Remainder of Freeway System	77	119	129	325	36,069	0.90